

聚合物光栅光波导器件的微复制技术

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摘要:

采用纳米压印微复制技术方法, 研制了一种新型的聚合物柔性光栅光波导敏感器件, 该器件可用于介入式医用导管的微弯挠曲监测或类似场合的微变形监测。论文重点阐述了聚合物柔性光栅光波导器件的微复制模具和器件微复制的工艺方法, 并对制备工艺技术中的关键技术问题进行了讨论, 讨论了测试光纤耦合一体化光栅波导器件的工艺方法。最后利用硅微模具和紫外固化介质材料, 成功制备出了截面尺寸为 $4\mu\text{m}\times 20\mu\text{m}$ 、光栅周期为 $0.75\mu\text{m}$ 的聚合物柔性光栅光波导器件。

关键词: 聚合物; 光栅光波导; 微复制工艺; 微挠曲监测

Micro-replication techniques of polymer optical grating waveguides

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Abstract:

Based on Nano-imprint Lithography and micro-replication process, a kind of flexible polymer grating waveguides was fabricated successfully in this paper. This novel grating waveguides could be used in strain sensing of human medical catheter and related applications. Process of this grating waveguide was presented and several skills were discussed. Further process with coupled optical fiber was discussed for suitable sensing application. By using silicon mould and UV-replication method, polymer grating waveguides with Core size $4\mu\text{m}\times 20\mu\text{m}$ and pitch $0.75\mu\text{m}$ were fabricated successfully in this paper.

Keywords: Polymer; polymer grating waveguide; micro replication process; micro deflection measurement

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